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# Oswald Research and Creativity Program

UK Office of Undergraduate Research

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# Oswald Research and Creativity Program

*Any current UK undergraduate (full- or part-time, enrolled for either semester) who does not already have a four-year degree is eligible for this competition and may submit papers and other projects in the following categories:*

1. *Biological Sciences*
2. *Design (architecture, landscape architecture, interior design, etc.)*
3. *Fine Arts (film, music, painting, sculpture, videotape, etc.)*
4. *Humanities: Creative*
5. *Humanities: Critical Research*
6. *Physical and Engineering Sciences*
7. *Social Sciences*

*Entries are judged on originality; clarity of expression; scholarly or artistic contribution; and the validity, scope, and depth of the project or investigation.*

*The following are the winners of the 2008-2009 competition:*

*(Extended versions of some of these entries are available at [www.uky.edu/kaleidoscope](http://www.uky.edu/kaleidoscope).)*

## CATEGORY 1: Biological Sciences

### 1st Place

**NAME:** Sudipa Chowdhury

**Chemistry major**

**TITLE:** *Potential Macrocylic B-Sheet Peptide That May Inhibit B-Amyloid Aggregates of Alzheimer's disease.*

Alzheimer's disease (AD) is a chronic and prevalent neurodegenerative disease, affecting approximately five million individuals in the United States. AD is characterized by disorientation, intellectual damage, and ultimately leads to death. Primarily, these physiological symptoms have been attributed to the accumulation of B-amyloid fragments, which tend to form hard, insoluble plaques between neurons. The development of an artificial, macrocylic B-sheet via a solid-phase peptide synthesis (SPPS) followed by solution-phase cyclization that imitate the hydrogen bonding edges of protein B-sheets could serve as inhibitors of protein-protein aggregation. One edge consists of "Hao", an unnatural amino acid previously developed by the Nowick lab, coupled with two other amino acids, while the other edge contains five additional amino acids. Two alpha-Orn side chains link the two edges together, thus producing, a macrocylic molecule. SPPS and solution-phase cyclization provide valuable and simple tools to generate macrocylic B-sheet peptides that can have useful purposes in several neurodegenerative diseases, such as AD. The goal of this research is to identify how the structure



of B-amyloid sheets of AD relates to the function from an organic synthesis approach in hopes of providing a more insightful look towards evaluating a potential therapeutic agent for AD.

### 2nd Place

**Georgianne Tiu**

**Biology major**

**TITLE:** *The Expression of Signaling Proteins in Control Brain Versus Mild Cognitive Impairment Brain: Insights into Alzheimer's Disease*



The purpose of this experiment was to measure the expression levels of key signaling proteins in brain from subjects with mild cognitive impairment (MCI) compared to control subjects. MCI is considered to be the beginning phase of Alzheimer's disease (AD). Tumor necrosis factor alpha (TNF  $\alpha$ ), nuclear factor kappa beta (NF  $\kappa$ B), phospho Bad (pBad), and ubiquitin C-terminal hydrolase-L1 (UCH-L1) are four proteins that were investigated. Trends of either decreases or increases in protein expression levels in MCI vs control brain were determined. Western blot analysis was used in order to identify these trends. These signaling proteins are reportedly either up-regulated or down-regulated in the AD brain; consequently, investigating protein expression levels in MCI brain may provide insight into how these proteins contribute to the transition from MCI to AD.

## CATEGORY 2: Design

### 1st Place

**NAME:** Joshua Berry

**Landscape architecture major.**

**TITLE:** *Lane Allen Plaza Greyfield Redevelopment*

This greyfield redevelopment project revitalized an underutilized and outdated greyfield site currently occupied by an indoor mall and a sea of parking (Turfland Mall). An in-depth analysis provided insight into many opportunities for community access to the site, better usage of commercial and residential space, and more efficient stormwater management practices. The new design concept formed a New Urbanist development with commercial and mixed-use clusters, residential areas, excellent pedestrian and bicyclist access, and large amounts of community park space.



## **Tie 2<sup>nd</sup> Place**

**NAME: Emily Thompson**

**Architecture major**

**TITLE: *Franklinton Community Center.***

This is a project that was completed this past fall semester in a third year architecture studio. This project was investigating how architecture can create an impact on an existing community. I chose Franklinton in Columbus, Ohio. This project was trying to reestablish a sense of community before it becomes gentrified through developers and artist. Franklinton is currently an area that consists of low-income families. In Franklinton, there is a lot of crime and drugs. My hope is that by reviving the community that is directly dictated by the members, then there will be less of an unwanted outside gentrification process. This will hopefully prevent the current residents from being pushed out of their homes. Reestablishing a community begins with a community center. There are currently many boys and girls clubs that have been shut down. So there is a need for the children of Franklinton to have a safe place. There is also a need for the community to have a gathering place. So this community center provides the solution to both of these problems as well as the overriding problem of preventing gentrification.



## **Tie 2<sup>nd</sup> Place**

**NAME: Valan Daniel**

**Architecture major**

**TITLE: *Floating Space***

This project is an addition to the Boston Public Library. It was an architecture studio project assigned by Prof. Karen Lewis in the Fall of 2008. The formal quality of the structure is designed around the history of the Back Bay area and the programmatic needs of the existing Boston Public Library. The project display consists of a 96" x 36" layout and a small wooden model of the addition. The layout needs to be pinned up to a wall and the model needs a stand for viewing.



## **CATEGORY 3: Fine Arts**

### **1st Place**

**NAME: Jaime Lazich**

**Psychology major**

**TITLE: *Comorbidity.***

"Comorbidity" Size: 10 8"x 10" mattes hanging or easel display. Comorbidity is defined as a concomitant but unrelated pathological or disease process or more simply, the simultaneous presence of two chronic diseases or conditions in a patient. When someone is afflicted with both anxiety and depression the two disorders feed upon each other and it is sometimes difficult to tell the difference between the two. I wanted to explore a similar theme in these double-exposed photographs. You see one photograph, but two different exposures within the frame. So we are presented with two separate visual landscapes that are super-imposed onto each other, and they contrast each other. They each try to stand independently from the other, but they also complement each other. It is impossible to attempt to view one exposure outside of its relationship



with the other. We cannot differentiate one exposure from the other because we will always see it in relation to its counterpart. Its comorbidity is encapsulated in the photograph

## **CATEGORY 4: Humanities: Creative**

### **1st place**

**NAME: Laura Benton**

**English major**

**TITLE: *Rosses Point***

The title of my creative writing piece is *Rosses Point*. These poems are carefully linked through a variety of common themes, motifs and images. They are inspired by the poetry of William Butler Yeats and my own travels throughout Europe. Many of these poems were written in Sligo, a county in Ireland where Yeats spent much of his childhood. It is in Sligo that I found a unique and exciting creative expression.

### **2nd Place**

**NAME: Eric Schlich**

**English major**

**TITLE: *The Tourist***

The Tourist is a short-story I wrote last semester in ENG 507: Advanced Creative Writing Workshop with Professor Gurney Norman. It is inspired by my experience of traveling abroad in Europe (Spain, Italy, France) in the Fall Semester of 2007, particularly rooted in the alarming feeling of being out of place and not belonging that accompanies the role of the tourist. The short-story is written in a bit of an experimental style for my writing, although I would not classify it as postmodern or under the heading of any specific school of writing. However, I do see it as a specific type of story: an in-depth analysis of the psyche of a character, not necessarily written in the traditional plot-driven literary technique.



## **CATEGORY 5: Humanities: Critical Research**

### **1st place**

**NAME:**

**Katherine Noe**

**French and English major**

**TITLE: *Subject Meets Object: Real Women of the 19<sup>th</sup> Century America Confront Biblical Representations of Femininity***

This paper explores the Biblical criticism of 19<sup>th</sup>- century women's rights activists, such as Elizabeth Cady Stanton and Matilda Joselyn Gage. The major issues discussed are



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individual agency and self-improvement and how the authors incorporate these ideas into their interpretations of the Bible. Also at issue is the relationship between woman as a symbol and real women. The title is "Subject Meets Object: Real Women of 19<sup>th</sup>-century America confront Biblical representations of femininity.

## 2nd Place

**NAME:** Jessalyn

**Ubellacker**

**International studies  
major**

**TITLE:** *The Burden of the Free: Freedom and the Ethics of Ambiguity.*

"The Burden of the Free" project developed from my introduction to the field of philosophy through the Gaines Fellowship in the Humanities seminar course led by Dr. Daniel Breazeale. Studying the works of Simone de Beauvoir in this seminar provided me the insight of viewing freedom as an ambiguous dilemma between the oppressed and the oppressor groups that exist in our society. This perspective developed into a research paper through which I found a connection between my great-grandmother's life in Austria during the Holocaust and the ideas proposed by de Beauvoir. By relating my great-grandmother's experiences to the philosophies of Simone de Beauvoir, I was eventually able to propose my own thoughts on the ethics of ambiguity surrounding the concept of freedom, which support the conclusion no one in our society can be truly free, unless everyone possesses freedom.

## CATEGORY 6: Physical and Engineering Sciences

### 1st place

**NAME:** Juan Carlos

**Cordova**

**Chemical engineering  
major**

**TITLE:** *Biodegradable hydrogels as orthopedic implants for growth plate regeneration.*

Biodegradable hydrogel systems are some of the most promising biomaterials for controlled drug delivery, and often medical implants. In this research the synthesis and characterization of biodegradable hydrogels has been completed for a target application as orthopedic implants in patients suffering from growth plate injuries. Specifically tailored poly (beta-amino ester) biodegradable hydrogel systems have been developed which possess a given set of properties including



appropriate degradation profiles, mechanical properties, porous structures created using various methods, and biocompatibility. Initial work included the synthesis and characterization of the macromer precursors. Macromers were characterized using gel permeation chromatography (GPC). Then, the macromer conversion to hydrogel was observed using FTIR analysis. Other characterization that was completed included mechanical properties through compressive analysis, pore characterization through scanning electron microscopy (SEM) imaging, and biocompatibility of systems through cell toxicity studies.

## CATEGORY 7: Social Sciences

### 1st place

**NAME:** Linsen Li

**History major**

**TITLE:** *From Tiananmen Square to Tianfu Square – A Narrative of the 1989 Student Protests in Chengdu*

This paper examines the 1989 student protests in Chengdu, China, and its correlation with the simultaneous but better-known protests in Beijing. While scholars generally acknowledge the importance of the Chengdu protests in the 1989 national movement, little research has been carried out thus far. The paper looks to analyze the Chengdu government's role in handling the protests and to compare and contrast the 1989 protests in the capital and at the provincial level. It asks the questions: How extensive were the Chengdu protests relative to the rest of the country? How did the Beijing leaders' handling of the protests influence Chengdu leaders' decision-making?

Based on primary sources in both Chinese and English, including the Chengdu Annals, transcripts of Chengdu provincial radio service, official edicts, party leaders' speeches, The Sichuan Daily, western media coverage, and witness accounts, the paper first reconstructs a narrative of the events in Chengdu. The narrative confirms that not only did Chengdu witness some of the most extensive protests at the provincial level; it also suffered what was likely the bloodiest crackdown outside of Beijing. Using this narrative and government-related sources, an analysis can then be drawn to gain some insight into the Chengdu government's handling of the student protests. Preliminary analysis suggests that the local officials, uncertain of the extraordinary situation they faced, were entirely dependent upon the central leadership's orders, which were often mixed and continually shifting. As a result, the Chengdu leaders acted indecisively during much of the movement, thus allowing it to eventually develop out of hand and resulting in a tragic ending.

### 2nd Place

**NAME:** Emily Wright

**Landscape architecture major**

**TITLE:** *The Physical and Political Barriers to Wind Energy Development in the United States.*

This paper explores the potential of wind generated energy in the United States and explains some of the reasons these resources have not been more adequately utilized. Once these barriers are addressed, solutions are proposed that reference policies in place in some U.S. State governments and in many European nations.

